LARGE SCALE DISTRIBUTION OF MASSIVE DOSE VITAMIN A IN INDONESIA (A STUDY OF THE OPERATIONAL ASPECTS)*

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Suatu pilot proyek pemberian vitamin A dosis tinggi (200.000 IU vitamin A dan 40 IU vitamin E dalam kapsul) sekali tiap 6 bulan kepada anak-anak umur 1–4 tahun di 20 kecamatan Jawa Barat, Tengah dan Timur diadakan mulai 1973.

Berdasar perhitungan proyeksi penduduk hasil sensus 1971, di wilayah proyek ini terdapat sejumlah 92.247–101.468 anak sasaran.

Pemberian kapsul vitamin A di tiap kecamatan dilakukan oleh dua petugas Puskesmas yang bekerja 3 hari seminggu sedemikian hingga dalam 6 bulan dicapai seluruh anak sasaran dalam wilayah tugasnya. Mereka masing-masing dibantu oleh dua tenaga desa selama bekerja di desa yang bersangkutan.

Pemberian kapsul dijalankan secara mengumpulkan anak-anak di suatu tempat di Rukun Tetangga, atau mengunjungi rumah-ke-rumah, atau kombinasi dari keduanya.

Tiap anak berumur 1–4 tahun didaftar nama, jenis, umur, nama orang tuanya.

Mereka yang berhasil diberi kapsul dicatat. Juga dicatat mereka yang tidak berhasil diberi kapsul, serta alasannya. Pada putaran berikutnya; semua anak yang menjadi berumur 1 tahun diberi kapsul, sedang yang lewat 4 tahun tidak diberi lagi.

Hasil penilaian tahun pertama menunjukkan bahwa 76–86 persen dari anak sasaran berhasil diberi kapsul. Jumlah ini menurun dari putaran pertama ke putaran kedua. Sebabnya a.l. musim hujan, sukar mengenali kembali anak yang telah diberi kapsul, dan penolakan orang tua terhadap pemberian kapsul kepada anaknya. Penolakan karena anak muntah dan berak setelah diberi kapsul sebesar setengah persen dari jumlah anak yang diberi kapsul. Tidak diketahui dengan pasti apakah itu gejala hipervitaminosis A.

Jumlah anak yang tidak berhasil diberi kapsul rata-rata 20 persen dari anak sasaran. Tidak diketahui apakah kepekaan terhadap defisiensi vitamin A mereka ini sama dengan yang berhasil diberi kapsul. Jika anak yang tidak berhasil diberi kapsul itu justru golongan terpeka, maka cara pencegahan defisiensi vitamin A ini belum berhasil.

Perhitungan sementara menunjukkan bahwa biaya pemberian vitamin A dosis tinggi ini per tahun per anak = 54 sen US$, dan akan berkurang bila modal awal dirata-ratakan untuk tahun-tahun berikutnya.

Indonesia's first large-scale distribution of massive dose vitamin A was initiated by the Ministry of Health in 1973 as a two-year pilot project. The objective of the project was to test the feasibility of distribution of vitamin A and to gain experience for future planning and implementation of distribution on a large scale.

This paper reports the first year experience of the project.

ORGANIZATION

The distribution was designed and directed by a Ministry of Health Vitamin A Committee, chaired by the Director General of Medical Care. Provincial health authorities were responsible for direction and supervision of project operations in their respective provinces.

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Implementation of the project represented the cooperation of several agencies including UNICEF which provided capsules and vehicles. WHO which provided consultation on operational questions, and the AFOB which provided consultants and financial support for evaluation of the project.

TARGET POPULATION

Clinical records and field surveys have indicated that on Java the highest incidence of ocular lesion related to vitamin A deficiency occurs in the age interval of 12 to 48 months. This interval was therefore designated as the target age group for the distribution of massive dose vitamin A. Geographic sites for the distribution were selected in each of the three provinces of Java. The sites were estimated to contain a total target population of approximately 100,000 children between the ages of 12 and 48 months.

This is equivalent to roughly one-seventieth of the total population of children in that age range living in Java. Over ninety per cent of the target population lived in rural areas.

VITAMIN A CAPSULES

The dosage distributed was 200,000 IU vitamin A with 40 IU tocopheryl acetate in oil, administered by mouth bi-annually. The capsule used was of soluble gelatin type which is administered by snipping off a protusion at one end and squeezing the contents into the child's mouth.

The capsule has the disadvantage that the oil tends to seep out the out end, soiling the workers' hands, and causing some loss of the vitamin.

During the adiminstration of the capsules the worker's hands often come into contact with children's mouths, causing concern about transferral of saliva from mouth to mouth. However the capsules carry the important advantage of being relatively easy to administer to fussy children, as the oily contents are difficult for such children to spit out.

DISTRIBUTION STAFF.

The focus of project operation in each area was the health center serving that area. Two health personnels were chosen from the staff of each participating health center to serve as field workers for the distribution. Forty workers from twenty health centers were selected in all. These workers had previous experience with mass compaign programs.

Before the project began they all attended a four-day workshop, where they received instruction on the problem and prevention of vitamin A deficiency, particularly on vitamin A distribution and record-keeping procedurs. Following the workshop the fieldworkers were assigned to the project on halftime basis, under the supervision of the physicians who administer the health centers.

Evaluation of these workers during the first year with the project has led to the conclusion that the qualities which are most important for effective work performance are dependability and preserverance.

In the opinion of the program administrators, distribution of high-potency vitamin A by any workers should remain under the supervision of the health center network as part areal health delivery.

IMPLEMENTATION.

The procedures of distribution began with preliminary visits to village leaders in the areas containing the target population. The purpose of these visits was to explain the distribution and to ask cooperation. Each village leader was requested to appoint two village residents to serve as assistants to the field workers while they carried out the distribution in that village. These assistants were paid a stipend for each day they worked. While in general the assistants were helpful, in many cases particularly in the urban areas, they proved to be neither dependable nor knowledgeable about their areas. The uneven performance of these local aides has led the project administrators to consider the use of alternative persons.

The field workers traveled from village to village by bicycle.

Some workers chose to carry out the distribution in teams of two, but most followed the more

efficient procedure of operating independently. In some villages the local leaders called together the parents to bring their children to a central location. Otherwise the workers walked from house to house to administer the capsule. In many areas a combination of the two methods was used. The gathering of parents and children was more efficient, but the procedure of going house to house reduced the chances of overlooking children who were ill, malnourished, or whose parents were unable or unwilling to bring them to a central collection point.

During the first six months of the distribution, the field workers visited all of the villages in their assigned areas once. Each child they encountered between the ages of 12 and 48 months was registered by name, name of parents, sex and age. Children of that are range who were residents of the village but away at the time were also registered.

If the child was given a capsule at the time of registration, that fact was recorded by the field worker. If the child was not given a capsule because he was away, very ill, or the parents refused the vitamin, the non-receipt and the reason were also recorded. Very ill children were not given capsules in order to avoid subsequent accidents being blamed on the capsule. At the time of the registration an identification card was filled out for each child and given to his parents.

During the second six months of the distribution, the workers revisited all the villages in their areas to distribute the second round of capsules. Again the receipt and non-receipt of a capsule by each child was recorded. Younger children became eligible to receive capsules when they reached the age of twelve months. Older children lost their eligibility when they passed the age of 48 months.

In practice, precise determination of each child's age was impossible and workers tended to extend the age boundaries by including rather than excluding children of questionable age.

Initial projections for average daily work performance were that 50 children could be dosed by one worker in one day. This was based on a rather high estimation of the number of target children, especially in Central Java.

As shown in table 1, the average number of children dosed in all three provinces by each worker per day during the first twelve months distribution is less than the number of children targeted. The relatively low performance rates in West Java has been mainly due to the large size of target population and geographical area to be covered by field workers.

Table 1. Performance per worker during the first twelve months.

	Average No. of work-days per month	No. children dosed per day	No. children targeted per day *)
West Java			
Cycle 1	11.7	44	56–61
Cycle 2	12.0	40	
Central Java			
Cycle 1	11.2	31	32–36
Cycle 2	11.8	28	
East Java			
Cycle 1	6.2	26	25–28
Cycle 2	5.8	24	

*) Total target children divided by total man/days. Front figure indicates minimum target, the rear maximum target.

This was not the case in Central Java where there were more workers for a relatively small geographical area and target population. In East Java, where not all villages served by the participating health centers were covered by the pilot projects, the relative performance rates were high. Considering the actual number of children treated during the first twelve months distribution, however, the work performance in West Java was the most efficient and East Java the least.

In each of three provinces the performance rates during the second distribution cycle were lower than they were in the first cycle.

COVERAGE OF TARGET POPULATION.

The proportion of target population which were given vitamin A capsules during the two distribution cycles range from 70 to 77 per cent in West Java, 82 to 90 per cent in Central Java, and 80 to 88 per cent in East Java. It can be seen from table 2 that about 10 to 30 per cent of the target population were left undosed. The unk-

nown factor in these figures is the extent to which marginal and deficient children were represented in that group.

Table 2. Vitamin A distribution coverage during the first twelve months.

	Number children given one (A)	Number children given two (B)	Total number capsules given (C)	Estimated number caps required by target child. (D)	C : D per cent
West Java Java	12,984	18,169	49,322	min 64,122 max 70,532	77 70
Central Java	23,306	34,722	92,750	min 102,614 max 112,876	90 82
East Java	3,773	5,922	15,617	min 17,758 max 19,530	88 80
Total	40,063	58,813	157,689	min 184,494 max 202,936	86 76

If the dosed and undosed children were equivalent in their susceptibility to vitamin A deficiency, it can be stated with assurance that the distribution has substantially reduced the incidence of hypovitaminosis A in over 70 per cent of the target population. If these two groups differ in their susceptibility, that statement may no longer be valid. Without knowledge of the relative susceptibilities of the two groups, it is impossible to determine with percision the extent to which vitamin A deficiency and related ocular lesions have been prevented.

DIFFICULTIES WITH DISTRIBUTION.

Several factors can be identified as having adversely affected worker efficiency. Among these are long distance to be traveled by bicycle, often over roads in poor condition; heavy rains in the wet season; removal of children to the fields during the harvest; unreliability of village aides; lack of cooperation of villagers. In the urban communities shifting populations and seasonal migration made it difficult to locate and identify eligible children. Table 3 indicates these difficulties.

Table 3. Children not dosed during the first twelve months.

	Away or moved	Very ill	Refused
West Java Cycle 1	790	219	19
Cycle 2	2010	332	185
Per cent incr	154	52	874
Cent. Java Cycle 1	1028	187	83
Cycle 2	2532	543	119
Per cent incr	146	190	43
East Java Cycle 1	221	69	30
Cycle 2	708	75	64
Per cent incr	220	9	113

The loss of efficiency from the first to the second distribution cycle is partially attributable to the fact that the second cycle was conducted during the rainy season. However, an additional factor seems to have been the requirement that each child be identified by name for the records. It was hoped that this process would be facilitated by the identification cards, but loss of these cards was high and worker time was consumed in replacing them. While identification of individual children was important for evaluation of the pilot project, this does not seem necessary for a routine distribution program. Consideration is now being given to development of a simpler system which would fill the basic requirements of preventing double-dosing and permitting checks in the workers' activities.

The field workers frequently encountered reports that the capsules had caused vomiting and diarrhea. As a results of these reports, there were instances in which parents refused to allow capsules to be administered to their children. Such rumors are to be expected in connection with a new medication, but concern about possible toxicity prompted investigation of reported incidents by physicians. While it is impossible to say categorically that no toxic incidents have occurred, it can be said that no incidents of hypervitaminosis A have been indentified since the project began.

Nevertheless, rumors about the capsules have persisted, and were more apparent during the second distribution cycle than the first. The principle affect of the rumors has been to require field worker and supervisor time to investigate reported incidents and to reassure villagers about

Table 4. Estimated target populations (Children 12–48 months).

Province	Sub-district	Minimum Est.	Maximum Est.
West Java	Cikeruh	6,473	7,120
	Situraja	4,823	5,305
	Cilamaya	10,363	11,399
	Jatisari	10,402	11,442
	Total	32,061	35,266
Central Java	Bringin	5,265	5,792
	Tuntang	4,872	5,359
	Salatiga	3,631	3,994
	Jambu	3,296	3,625
	Bawen	3,412	3,753
	Susukan *	5,948	6,542
	Suruh	4,972	5,469
	Tengaran *	3,745	4,120
	Ungaran	6,137	6,751
	Gunungpati	3,072	3,379
	Klepu	6,957	7,653
	Total	51,307	56,437
East Java	Babat	1,805	1,985
	Kembangbahu	1,529	1,681
	Tikung	1,615	1,776
	Tambaksari	1,838	2,022
	Tandes	2,092	2,301
	Total	8,879	9,765
	Grand Total	92,247	101,468

*) Adjusted by subtraction of population in clinical study area.

the safety and the benefits of the capsules.

Actual refusals have amounted in the second cycle to only one-half of one per cent of the number of children dosed during that cycle.

It is hoped that as the distribution continues and the capsules become more familiar, fears and rumors about their effects will decline.

COST OF THE DISTRIBUTION.

The cost of the distribution for the first year, excluding evaluation costs, averaged 27 cents US per capsule distributed, or 54 cents US per child/year of protection. These figures include initial outlays for field workers' bicycles and training. Average cost per capsule will therefore be somewhat less when averaged over the full four distribution cycles of the project. Efficiency of project operations differed widely between the provinces, with average cost per capsule running three to four times higher in East Java than in West or Central Java.

CONCLUSION

The implementation of the pilot project has demonstrated the feasibility of reaching a substantial proportion of the pre-school age population with massive dose vitamin A. The dosage, administered by means of the soluble gelatin capsule, has proven acceptable to the population, with no toxic reactions observed. While the per capita cost of the distribution has been higher than anticipated, costs are expected to decline somewhat as initial outlays are averaged over further cycles.

The administrative structure can, with some modifications, be adapted for expanded distributions. The pilot project has provided a sound basis for the planning of further distributions. It is hoped that the experience here may be of value to other countries planning similar programs.

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